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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

TRUONG, CAM Y T

ART UNIT PAPER NUMBER

2162

DATE MAILED: 06/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/086,597

Applicant(s)

LANZATELLA ET AL.

Examiner

Cam Y T Truong

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 March 2005.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 21-40 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 21-40 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. Applicant has canceled claims 1-20 and added claims 21-40 in the amendment filed on 3/14/2005.

Applicant's arguments with respect to claims 21-40 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 21-27, 29, 31-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mutalik et al (or hereinafter "Mutalik") (US 6360330) in view of Ohran (US 6085298).

As to claim 21, Mutalik teaches the claimed limitations:

"initiating a backup operation on a set of data from a first computing device" as the backup server, which makes use of operating system-independent file handling call, sends each file to be backed up, a retrieval request including the list of disk extents and associated physical disk storage devices to the control circuitry. After receiving the list of disk extents from server 13, the control circuitry 15 retrieves or acquires the data from storage mirrors 16(s). A file consists of data stored in an ordered series of disk extents (col. 10, lines 60-67; col. 11, line 1-11; col. 8, lines 34-35);

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"creating a logical representation of a frozen image of the set of data at the first computing device" as the stored data of a file in disk extents of storage mirrors 16(s) is image. This image is not frozen image. The backup server, which makes use of operating system-independent file handling call, sends each file to be backed up, a retrieval request including the list of disk extents and associated physical disk storage devices to the control circuitry. The above information shows that disk extents of storage mirrors 16 (s) are created at the server as the first computing device (col. 10, lines 60-67; col. 11, line 1-11; col. 14, lines 33-35);

"sending the logical representation to a second computing device" as a control circuitry receives the list of disk extents and associated physical disk storage devices from the backup server 13. The control circuitry is represented as a second computing device (fig. 2D, col. 10, lines 61-67; col. 8, lines 20-34);

"reading the set of data from the frozen image from the second computing device" as the stored data in disk extents of storage mirrors 16(s) is image. This image is not frozen image. The backup server, which makes use of operating system-independent file handling call, sends each file to be backed up, a retrieval request including the list of disk extents and associated physical disk storage devices to the control circuitry. After receiving the list of disk extents from server 13, the control circuitry 15 retrieves or acquires the data from storage mirrors 16(s). The above information implies that storage mirrors 16(s) is issued each retrieval request for each file to be backed up indirectly from the server 13 via the control circuitry 15. Each retrieval request of each file to be backed up such as each read operation is

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represented as one input/output operation. The storage mirrors 16(s) is represented as one storage device (col. 10, lines 60-67; col. 11, line 1-11; col. 14, lines 33-35); and

“writing the set of data to a storage medium” as the server 13, which makes use of operating system-independent file handling call, transfers the retrieved data from the mass storage subsystem 12 to the backup data store 14. This backup data store 14 stores the data on the backup medium. The above information indicates that backup medium is issued the transferring retrieved data indirectly from the server 13 to store or write the retrieved data to the backup medium. The backup medium is represented as a storage media. The transferring the retrieved data such as a write operation is represented as one I/O operation (fig. 2D, col. 11, lines 1-7; col. 14, lines 33-35).

Mutalik does not explicitly teach the claimed limitation “frozen image, validating that the set of data corresponding to the frozen image has not been modified after an initiation of the backup operation; and upon a successful validation”. Ohran teaches if the storage location has had new data stored therein since the snapshot was taken, then step 116 indicates that the data block is retrieved from snapshot storage. If, however, the content of a storage location has not changed since the snapshot was taken, then step 118 indicates that the data block is retrieved from mass storage device 20. In either case, the data block is returned to the requesting process by step 120. The data blocks that are sent to the backup system are only those data blocks that have changed since the last backup. The above information shows that the data block corresponding to the snapshot is validated successfully that the data block is changed after a backup operation (col. 22, lines 40-50). In addition since data is

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preserved by a snapshot at time t1, the data will be available for transferring to the backup storage device even though new data is written to the mass storage device after time t1 (col. 11, lines 38-42). Further, applicant defined that the term "frozen image" as the data is stabilized at a point in time by using snapshot (page 13, lines 24-27; page 10, lines 3-5). Thus, the preserved data by a snapshot at time t1, which is a stable version of the data, is represented as a frozen image of the data.

It would have been obvious to a person of an ordinary skill in the art at the time the invention was made to apply Ohran's teaching of preserving the data by a snapshot at time T1 for transferring to the backup storage device and successfully checking whether the data block is not modified to Mutalik's system in order to prevent changes to the data during the backup process (col. 3, line 50) and further to preserve the original data of the primary mass storage device during the backup process.

As to claim 3.1, Mutalik teaches the claimed limitations:

"a first and a second computing device" as server 13 and the mass storage subsystem 12 (col. 10, lines 55-65);

"a first and a second storage medium" as the backup data stores (col. 4, lines 44-45);

"wherein the first computing device is configured to: initiate a backup operation on a set of data stored at the first storage medium" as shown in fig 1, the backup server initiate a backup operation on a set of data stored at the backup data store 14 (col. 10, lines 50-67);

“creating a logical representation of a frozen image of the set of data” as the stored data of a file in disk extents of storage mirrors 16(s) is image. This image is not frozen image. The backup server, which makes use of operating system-independent file handling call, sends each file to be backed up, a retrieval request including the list of disk extents and associated physical disk storage devices to the control circuitry. The above information shows that disk extents of storage mirrors 16 (s) are created at the server as the first computing device (col. 10, lines 60-67; col. 11, line 1-11; col. 14, lines 33-35);

“sending the logical representation to the second computing device” as a control circuitry receives the list of disk extents and associated physical disk storage devices from the backup server 13. The control circuitry is represented as a second computing device (fig. 2D, col. 10, lines 61-67; col. 8, lines 20-34).

Mutalik does not explicitly teach the claimed limitation “frozen image, wherein the second computing device is configured to: validating that the set of data corresponding to the frozen image has not been modified after an initiation of the backup operation; and upon a successful validation”. Ohran teaches if the storage location has had new data stored therein since the snapshot was taken, then step 116 indicates that the data block is retrieved from snapshot storage. If, however, the content of a storage location has not changed since the snapshot was taken, then step 118 indicates that the data block is retrieved from mass storage device 20. In either case, the data block is returned to the requesting process by step 120. The data blocks that are sent to the backup system are only those data blocks that have changed since the last backup.

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The above information shows that the data block corresponding to the snapshot is validated successfully that the data block is changed after an backup operation (col. 22, lines 40-50). In addition since data is preserved by a snapshot at time t1, the data will be available for transferring to the backup storage device even though new data is written to the mass storage device after time t1 (col. 11, lines 38-42). Further, applicant defined that the term "frozen image" as the data is stabilized at a point in time by using snapshot (page 13, lines 24-27; page 10, lines 3-5). Thus, the preserved data by a snapshot at time t1, which is a stable version of the data, is represented as a frozen image of the data.

It would have been obvious to a person of an ordinary skill in the art at the time the invention was made to apply Ohran's teaching of preserving the data by a snapshot at time T1 for transferring to the backup storage device and successfully checking whether the data block is not modified to Mutalik's system in order to prevent changes to the data during the backup process (col. 3, line 50) and further to preserve the original data of the primary mass storage device during the backup process.

As to claims 22 and 32, Mutalik teaches the claimed limitation "writing the changed data to the storage medium" as writing files into backup store 14. The files are changed data (col. 11, lines 1-10). Mutalik does not explicitly teach the claimed limitation "changed data; upon an unsuccessful validation, producing a remapped frozen image at the first computing device; sending changes in the remapped frozen image to the second computing device; reading changed data corresponding to the changes in

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the remapped frozen image from the second computing device". Ohran teaches the map that was used to track, which storage locations had data written therein between time T0 and time T1 to identify the data that should be transferred to the backup storage device. Note that only those data blocks that were changed between time T0 and T1 are transferred. Those data blocks contain changed records at a particular point in time. The map is modified when the data block is changed. The above information indicates that the system produce a remapped snapshot data blocks to transfer changes only (figs. 2&7A, col. 11, lines 41-46; col. 12, lines 15-18).

It would have been obvious to a person of an ordinary skill in the art at the time the invention was made to apply Ohran's teaching of using the map to determine which data blocks have been changed after creating records in particular point in time and only transferring changed data blocks into Mutalik's system in order to synchronize or maintain data blocks between storage device and backup server and further to reduce the amount of data needed to create a backup copy (col. 5, line 15).

As to claims 23 and 33, Mutalik teaches the claimed limitation "using input/output (I/O) operations provided by an operating system in use at the second computing device to read the set of data" as (fig. 2D, col. 11, lines 1-7; col. 14, lines 33-35).

As to claims 24 and 34, Mutalik teaches the claimed limitation "using input/output (I/O) operations provided by an operating system in use at the second computing device to write the set of data" as (fig. 2D, col. 11, lines 1-7; col. 14, lines 33-35).

As to claims 25 and 35, Mutalik teaches the claimed limitation “wherein the logical representation includes one or more storage extents” as the stored data in storage mirrors 16(s) of mass storage subsystem 12 is an image. This image is not a frozen image. A control circuitry receives the list of disk extents and associated physical disk storage devices from the backup server 13. The physical disk storage devices comprise the respective storage mirrors 16(s), which stores the data or file (fig. 2D, col. 10, lines 61-67; col. 8, lines 20-34).

As to claims 26 and 36, Mutalik and Ohran disclose the claimed limitation subject matter in claim 21 and 31, Ohran further teaches the claimed limitation “associating a configuration identifier with the frozen image; modifying the configuration identifier upon a modification of the set of data associated with the frozen image” as associating a snapshot map 52 with snapshot of a data; modifying the snapshot map 52 when modifying data block associated with a snapshot (col. 18, lines 1-20; col. 26, lines 30-50; col. 24, lines 1-10).

It would have been obvious to a person of an ordinary skill in the art at the time the invention was made to apply Ohran’s teaching of as associating a snapshot map 52 with snapshot of a data and modifying the snapshot map 52 when modifying data block associated with a snapshot to Mutalik’s system in order to determine which data blocks have been changed after creating records in particular point in time and only transferring changed data blocks into Mutalik’s system in order to synchronize or

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maintain data blocks between storage device and backup server and further to reduce the amount of data needed to create a backup copy (col. 5, line 15).

As to claims 27, Mutalik and Ohran disclose the claimed limitation subject matter in claim 21, Ohran further teaches the claimed limitation "verifying that the configuration identifier has not changed after the initiation of the backup operation" as if the storage location has had new data stored therein since the snapshot was taken, then step 116 indicates that the data block is retrieved from snapshot storage. If, however, the content of a storage location has not changed since the snapshot was taken, then step 118 indicates that the data block is retrieved from mass storage device 20. In either case, the data block is returned to the requesting process by step 120. The data blocks that are sent to the backup system are only those data blocks that have changed since the last backup. The storage location of the data is stored in backup map. When the system validates the storage location of the backup map, the system implies validating the backup map. The above information shows that the data block corresponding to the snapshot is validated successfully that the data block is changed after an backup operation (col. 22, lines 40-50; col. 24, lines 1-47).

It would have been obvious to a person of an ordinary skill in the art at the time the invention was made to apply Ohran's teaching of preserving the data by a snapshot at time T1 for transferring to the backup storage device and successfully checking whether the data block is not modified to Mutalik's system in order to prevent changes

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to the data during the backup process (col. 3, line 50) and further to preserve the original data of the primary mass storage device during the backup process.

As to claims 29 and 39, Mutalik teaches the claimed limitation "wherein the set of data includes at least one of a file, a set of files, a file system, a set of file systems, a volume, and a set of volumes" as the stored data in storage mirrors 16(s) is file (fig. 2D, col. 8, lines 34-35; col. 10, lines 65-67).

As to claim 37, Mutalik and Ohran discloses the claimed limitation subject matter in claim 31, Ohran further teaches the claimed limitation "wherein the second computing device is further configured to validate that the set of data corresponding to the frozen image has not been modified after an initiation of the backup operation by verifying that the configuration identifier has not changed the initiation of the backup operation" as if the storage location has had new data stored therein since the snapshot was taken, then step 116 indicates that the data block is retrieved from snapshot storage. If, however, the content of a storage location has not changed since the snapshot was taken, then step 118 indicates that the data block is retrieved from mass storage device 20. In either case, the data block is returned to the requesting process by step 120. The data blocks that are sent to the backup system are only those data blocks that have changed since the last backup. The storage location of the data is stored in backup map. When the system validates the storage location of the backup map, the system implies validating the backup map The above information shows that

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the data block corresponding to the snapshot is validated successfully that the data block is changed after an backup operation (col. 22, lines 40-50; col. 24, lines 1-47).

It would have been obvious to a person of an ordinary skill in the art at the time the invention was made to apply Ohran's teaching of preserving the data by a snapshot at time T1 for transferring to the backup storage device and successfully checking whether the data block is not modified to Mutalik's system in order to prevent changes to the data during the backup process (col. 3, line 50) and further to preserve the original data of the primary mass storage device during the backup process.

4. Claims 28 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mutalik et al (or hereinafter "Mutalik") (US 6360330) in view of Ohran and further in view of Kodama et al (or hereinafter "Kodama") (US 6542962).

As to claims 28 and 38, Mutalik and Ohran discloses the claimed limitation subject matter in claims 21 and 31, except the claimed limitation "using error handling facilities provided by an operating system in use at the second computing device to detect and handle any errors produced during the reading and the writing". Kodama teaches that a server processor 12 will get its first indication of a problem with its allocated disk storage when, at step 90, and error message from the file system, indicating that an error has been received in connection with an I/O read request. The error message will further indicate that the allocated disk storage unit 20 has failed. If such as an error is received, the receiving server processor 12 will send a failover message to Mount Manager 20. The above information shows that an error processing

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associated with an I/O request is performed by the processor as the operating system (col. 8, lines 15-25).

It would have been obvious to a person of an ordinary skill in the art at the time the invention was made to apply Kodama's teaching of processing received error message in connection with an I/O read request by a server processor to Mutalik's system in order to reduce minimum conflict to other read and/or write operations conducted at or about the same time by other processor units (col. 2, lines 12-14).

5. Claims 30 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mutalik et al (or hereinafter "Mutalik") (US 6360330) in view of Dunham et al (or hereinafter "Dunham") (US 6714952).

As to claims 30 and 40, Mutalik and Ohran discloses the claimed limitation subject matter in claims 21 and 31, except the claimed limitation "wherein the set of data is stored at one or more storage devices interconnected to the first and second computing devices by a storage area network (SAN)". Dunham teaches the backup restore/server 30 is connected to SAN. File servers 16a and 16b are connected to the SAN 18 which controls access to various storage devices 20a-20c upon which different hosts (col. 4, lines 6-10).

It would have been obvious to a person of an ordinary skill in the art at the time the invention was made to apply Dunham's teaching of connecting the backup restore/server 30 to SAN to Mutalik's system in order to enable direct high speed connections between various storage elements and host systems (col. 4, lines 65-67;

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col. 5, line 1) and further provide high bandwidth and high throughput storage for client computers such as file servers, web servers and end user computers.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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Contact Information

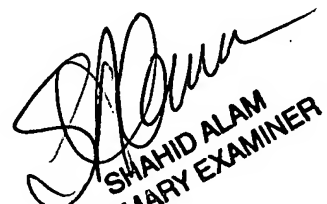
7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cam Y T Truong whose telephone number is (571) 272-4042. The examiner can normally be reached on Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Breene can be reached on (571) 272-4107. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Cam Y T Truong
Examiner
Art Unit 2162

5/25/2005


SHAHID ALAM
PRIMARY EXAMINER